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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,658	04/15/2004	Joseph Hess	NOVAP0012	7721
24203	7590	02/20/2007	EXAMINER	
GRIFFIN & SZIPL, PC SUITE PH-1 2300 NINTH STREET, SOUTH ARLINGTON, VA 22204			MARTIN, LAURA E	
			ART UNIT	PAPER NUMBER
			2853	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/20/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/824,658

Applicant(s)

HESS ET AL.

Examiner

Laura E. Martin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

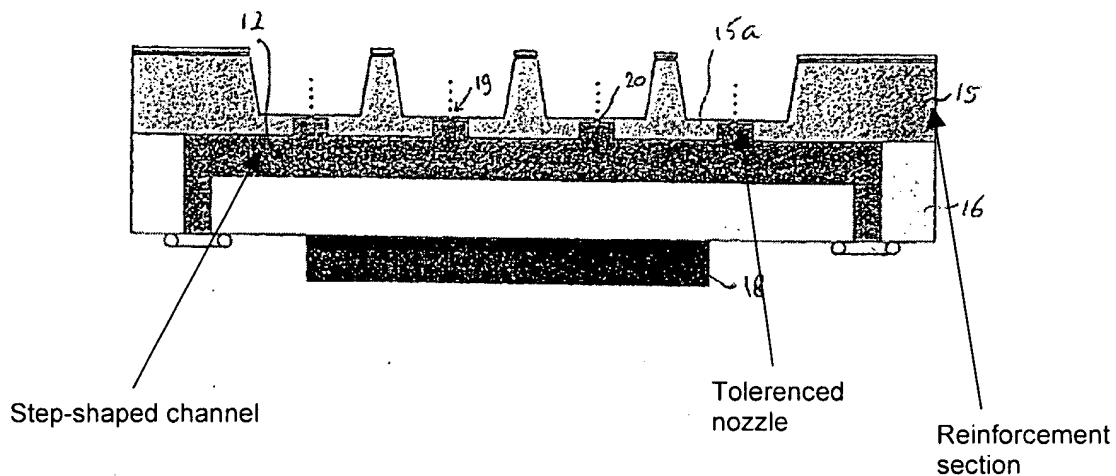
Claims 1, 9, 11, 13, 14, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hess et al. (EP 1273355) in view of Luginbuhl et al. (US 6323762) and Brown (US 5526957).

As per claim 1, Hess et al. teaches a nozzle body for a liquid droplet (figures 3a, 3b, and 3c) comprising: a first substrate in which a space is formed (figure 3a, element 16), a second substrate having one or more nozzle membrane sections (figure 3a, elements 15 and 15a) and reinforcement section (figure 3a, element 15), wherein said first and second substrates are arranged such to enclose the space [0027], wherein each of said nozzle membrane sections comprises a high density array of outlet nozzles and output channels (figure 3a, element 20) that connect said enclosed space with each of said outlet nozzles, said outlet nozzles and said output channels having a tightly toleranced, straight, non-tapered shape, wherein said second substrate has a top surface in which at least one cavity is formed (figure 3a, element 15a) so as to provide the nozzle membrane section corresponding to the bottom of said cavity with surrounding reinforcement sections, and a bottom surface adjacent to and enclosing said space thus forming a chamber for containing said liquid substance [0027-0029],

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wherein each said nozzle output channel is step shaped [0018] with a wider portion being adjacent said space (figure 3a, element 15) such that the exterior side wall of the protrusion section of said output channel is a substantially straight angle with respect to the top surface of said nozzle membrane section of said second substrate (figure 3a, element 12). Examiner notes that the preamble does not hold weight to the claim rejection.

Figure 3a



As per claim 9, Hess et al. teaches a liquid droplet spray device comprising a nozzle body (figure 3a) and a vibrating element disposed to vibrate liquid in said space so as to eject said liquid substance as a spray through the outlet nozzles (figure 3a, element 18; [0033]).

As per claim 11, Hess et al. teaches a vibrating element being a piezoelectric element [0033].

As per claims 13 and 14, Hess et al. teaches a vibrating element disposed to vibrate liquid in said space so as to eject said liquid substance as a spray through the outlet nozzles [0033].

As per claim 1, Hess et al. does not disclose a thinner portion containing a protrusion section protruding beyond the top surface of said nozzle membrane section of said second substrate such that the exterior wall of the protrusion section of the output channel is substantially straight, and said space consists of at least two sub-spaces separated by a flexible but leak-tight separation, each sub-space containing a different liquid to be ejected together through the nozzle membrane section.

As per claim 18, Hess et al. does not disclose a flexible but leak-tight separation is a leak-tight vertical membrane.

As per claim 19, Hess et al. does not disclose the different liquids are ejected together through the same nozzle membrane section.

As per claim 1, Luginbuhl et al. discloses a thinner portion containing a protrusion section protruding (figure 1, element 12) beyond the top surface of said nozzle (figure 1, element 22) section of said second substrate such that the exterior wall of the protrusion section of the output channel is substantially straight.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Hess et al. with the disclosure of Luginbuhl et al in order to produce small droplets of equal size.

As per claim 1, Brown et al. discloses a space consisting of at least two sub-spaces separated by a flexible but leak-tight separation, each sub-space containing a

different liquid to be ejected together through the nozzle membrane section (figure 3, elements 128, 130, 50, and 54).

As per claim 18, Brown et al. discloses a flexible but leak-tight separation is a leak-tight vertical membrane (figure 3, membranes between elements 128 and 130).

As per claim 19, Brown et al. discloses the different liquids are ejected together through the same nozzle membrane section (figure 3, element 34).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Hess et al. with the disclosure of Brown et al. in order to prevent liquids from mixing and reacting prior to ejection and dispensing.

Claims 2 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hess et al. (EP 1273355), Luginbuhl et al. (US 6323762) and Brown (US 5526957), and further in view of Silverbrook (US 666933).

Hess et al. as modified teaches the nozzle body of claim 1 and a vibrating element disposed to vibrate liquid in said space so as to eject said liquid substance as a spray through the outlet nozzles [0033]; however, it does not teach the array corresponding to an array having at least 85 outlet nozzles for a nozzle membrane section of $500\text{ }\mu\text{m}^2$.

Silverbrook et al. teaches an array corresponding to an array having at least 85 outlet nozzles for a nozzle membrane section of $500\text{ }\mu\text{m}^2$ (column 12, lines 24-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the nozzle body of Hess et al. as modified with the disclosure of Silverbrook in order to create a higher quality printed image.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hess et al. (EP 1273355), Luginbuhl et al. (US 6323762) and Brown (US 5526957).

Hess et al. discloses the claimed invention except for an array having at least 169 and 300 outlet nozzles for a membrane section of $500 \mu\text{m}^2$. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have large amounts of nozzles in order to print high definition pictures, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205, USPQ 215 (CCPA 1980).

Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hess et al. (EP 1273355), Luginbuhl et al. (US 6323762) and Brown (US 5526957), and further in view of Adachi et al. (US 20020458952).

Hess et al. as modified teaches the nozzle body according to claim 1 and a vibrating element disposed to vibrate liquid in said space so as to eject said liquid substance as a spray through the outlet nozzles [0033]; however, it does not disclose the viscosity of the liquid being at least 5 mPas.

Adachi et al. teaches the viscosity of the liquid being at least 5 mPas [0073].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the nozzle body of Hess et al. as modified with the disclosure of Adachi et al. in order to create a high quality printed image.

Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hess et al. (EP 1273355), Luginbuhl et al. (US 6323762) and Brown (US 5526957), and further in view of Koto (US 4434430).

Hess et al. and Luginbuhl et al. teach the nozzle body of claim 1. Hess et al. teaches a vibrating element disposed to vibrate liquid in said space so as to eject said liquid substance as a spray through the outlet nozzles [0033] and Luginbuhl et al. discloses forming substrates by machining (column 1, line 65-column 2, line 13); however, Hess et al. and Luginbuhl et al. do not disclose the first and second substrate being formed integrally from one substrate.

Koto teaches a first and second substrate being formed integrally from one substrate (column 9, lines 50-64).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the nozzle body of Hess et al. as modified with the disclosure of Koto in order to create a high quality product using less materials.

Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hess et al. (EP 1273355), Luginbuhl et al. (US 6323762) and Brown (US 5526957) and further in view of Hartman (US 20030085966).

Hess et al. as modified teaches the nozzle body of claim 1 and a vibrating element disposed to vibrate liquid in said space so as to eject said liquid substance as a spray through the outlet nozzles [0033].; however, it does not disclose a space consisting of a soft porous medium for containing the liquid substance or a vibrating element being a piezoelectric element.

Hartman discloses a space consisting of a soft porous medium for containing the liquid substance [0024].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the nozzle body of Hess et al. as modified with the disclosure of Hartman in order to easily contain liquid within the body.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hess et al. (EP 1273355), Luginbuhl et al. (US 6323762) and Brown (US 5526957) and further in view of Adachi et al. (US 20030107159).

Hess et al. as modified teaches the nozzle body of claim 1; however, it does not disclose the vibrating element is attached to the body through removable attachment means.

Adachi et al. teaches a vibrating element is attached to the body through removable attachment means [0057].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the nozzle body of Hess et al. as modified with the disclosure of

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Adachi et al. in order to allow for easy replacement of damaged or non-working vibrating elements.

Response to Arguments

Applicant's arguments with respect to claims 1-7 and 9-19 have been considered but are moot in view of the new ground(s) of rejection.

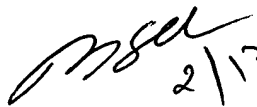
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura E. Martin whose telephone number is (571) 272-2160. The examiner can normally be reached on Monday - Friday, 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Laura E. Martin


2/13/07
MANISH S. SHAH
PRIMARY EXAMINER